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ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

APPENDIX

Changes of ambient temperature, relative humidity, THI, cardiorespiratory frequency and rectal temperature of buffaloes

No. 1 and 2 during control period and heat exposure period.

	buffalo No.1				buffalo No.2			
	0	1	2	3	0	1	2	3
Ambient temperature								
Dry Bulb (°C)	C 27.5	27.5	26.5	25.5	C 28.0	30.0	31.0	31.0
	H 37.5	38.5	41.0	41.0	H 28.0	38.0	39.0	41.0
Wet bulb (°C)	C 25.0	25.0	24.5	23.5	C 22.0	22.0	22.5	22.5
	H 26.0	32.0	33.0	31.0	H 26.0	30.0	31.0	32.0
Relative humidity (%)	C 78.0	78.0	82.0	81.0	C 53.0	44.0	44.0	44.0
	H 62.0	56.0	51.0	41.0	H 82.0	49.0	50.0	45.0
THI	C 78.4	78.4	77.3	75.9	C 76.6	78.0	79.1	79.1
	H 86.3	91.4	93.9	92.4	H 79.5	89.6	91.0	93.2
Heart rate (beats/min)	C 37	42	48	54	C 48	48	48	48
	H 36	42	40	42	H 40	40	40	39
Respiratory rate (breaths/min)	C 32	32	28	30	C 20	26	25	26
	H 30	38	46	56	H 16	28	30	58
Rectal temperature (°C)	C 38.6	38.7	38.9	38.9	C 37.6	37.6	38.0	38.0
	H 38.5	38.6	38.9	39.0	H 37.6	38.0	38.5	38.4
body weight (kgs.)	C	343				372		
	H	351				347		

C = control period, H = heat exposure period

Changes of ambient temperature, relative humidity, THI, cardiorespiratory frequency and rectal temperature of buffaloes

No. 3 and 4 during control period and heat exposure period.

	buffalo No.1				buffalo No.4			
	0	1	2	3	0	1	2	3
Ambient temperature								
Dry Bulb (°C)	C 21.0	23.0	24.0	24.0	C 26.5	28.0	29.0	28.5
	H 32.0	39.0	40.0	40.5	H 32.0	38.0	42.0	41.0
Wet bulb (°C)	C 16.0	17.0	17.0	17.0	C 22.5	23.0	24.0	23.5
	H 27.0	30.0	30.5	31.0	H 29.0	29.0	32.0	31.0
Relative humidity (%)	C 54.0	49.0	44.0	44.0	C 66.0	60.0	55.0	60.0
	H 62.0	45.0	43.0	41.0	H 76.0	44.0	42.0	41.0
THI	C 67.2	69.4	70.1	70.1	C 75.9	77.3	78.8	78.0
	H 83.1	90.3	91.4	92.1	H 84.5	88.8	93.9	92.4
Heart rate (beats/min)	C 34	36	32	32	C 42	42	40	40
	H 52	52	56	60	H 40	42	44	44
Respiratory rate (breaths/min)	C 12	13	15	15	C 20	22	20	26
	H 24	34	41	48	H 38	54	70	46
Rectal temperature (°C)	C 36.8	36.8	36.8	36.8	C 37.9	38.1	38.0	38.2
	H 38.5	38.7	38.9	39.0	H 38.7	38.9	38.9	39.2
body weight (kgs.)	C		438.5				412	
	H		438.5				422	

C= control period, H = heat exposure period

Changes of ambient temperature, relative humidity, THI, cardiorespiratory frequency and rectal temperature of buffalo No. 5 during control and heat exposure period.

		hour			
		0	1	2	3
Ambient temperature					
Dry Bulb (°C)	C	29.5	30.0	32.0	32.5
	H	31.0	37.0	42.0	42.0
Wet bulb (°C)	C	24.0	22.5	22.5	23.5
	H	27.0	29.0	32.0	32.0
Relative humidity (%)	C	55.5	46.0	38.0	40.0
	H	68.0	48.0	42.0	42.0
THI	C	79.1	78.4	79.8	80.9
	H	82.4	88.1	93.9	93.9
Heart rate (beats/min)	C	48	48	48	48
	H	48	52	48	48
Respiratory rate (breaths/min)	C	20	22	28	28
	H	17	30	38	80
Rectal temperature (°C)	C	38.8	38.8	38.9	38.9
	H	38.6	38.6	38.8	38.9
body weight (kgs.)	C			334	
	H			365	

C = control period, H = heat exposure period



Changes of glucose metabolism of five swamp buffaloes during control and heat stress period.

	No.				
	1	2	3	4	5
3- ³ H-glucose pool size (gm)	C 96.154	100.0	78.125	161.29	128.205
	H 76.923	68.966	307.692	133.333	200.0
3- ³ H-glucose pool size (mg/K ³)	C 1214.07	1186.24	813.80	1770.47	1643.65
	H 950.84	862.08	3205.13	1433.69	2409.64
3- ³ H-glucose turnover rate (mg/min)	C 951.923	1414.286	530.791	971.948	935.223
	H 969.23	694.7	1640.2	923.998	1108.8
3- ³ H-glucose turnover rate (mg/min.K ³)	C 12.019	16.777	5.529	10.669	11.990
	H 11.981	8.684	17.085	9.935	13.359
U- ¹⁴ C glucose turnover rate (mg/min)	C 665.546	591.492	406.693	770.0	390.203
	H 810.527	716.2	1636.364	1015.385	1095.652
U- ¹⁴ C glucose turnover rate (mg/min.K ³)	C 8.403	7.017	4.236	8.452	5.003
	H 10.019	8.953	17.045	10.918	13.201
Glucose recycling (%)	C 30.084	58.177	44.911	20.778	58.277
	H 16.374	-3.095	0.234	-9.890	1.186
T _{1/2} 3- ³ H glucose (min)	C 70	49	85	115	95
	H 55	70	130	100	125
T _{1/2} U- ¹⁴ C glucose (min)	C 85	101	118	90	185
	H 90	75	110	130	115

C = control period, H = heat exposure period

Effect of heat stress on plasma volume, blood volume and packed cell volume of five swamp buffaloes.

	No.				
	1	2	3	4	5
Plasma volume	P 15.824	12.307	15.824	20.677	13.603
(litre)	H 14.098	14.359	15.824	20.677	13.369
Plasma volume	P 45.083	35.457	36.087	48.998	37.268
(ml/kg)	H 40.165	41.380	36.087	48.998	36.627
Blood volume	P 20.685	17.581	21.677	30.407	18.972
(litre)	H 18.797	19.669	21.529	30.497	18.314
Blood volume	P 58.932	50.666	49.434	72.055	51.978
(ml/kg)	H 53.553	56.683	49.097	72.268	50.175
Packed cell volume	P 23.5	30.0	27.0	32.0	28.3
(%)	H 25.0	27.0	26.5	32.1	27.0

P = preexposure period, H = heat exposure period

Changes of renal function, electrolyte and urea excretion, fractional electrolyte excretion and free water clearance of buffalo No. 1 during control and heat exposure period.

	control period						heat exposure period					
	hour						hour					
	1	2	3	0	1	2	3	0	1	2	3	
GFR (ml/min)	216.98	178.70	188.04	242.92	302.94	285.68	333.36					
ERFF (ml/min)	894.89	962.54	957.72	1114.05	1499.56	1374.58	1630.32					
RBF (ml/min)	1225.88	1336.86	1330.17	1456.27	1999.41	1832.77	2173.76					
FF (%)	24.247	18.565	19.634	21.805	20.202	20.783	20.448					
V (ml/min)	4.92	4.83	5.36	6.59	9.68	5.72	5.94					
Filtered load of urea (mg/min)	126.0	105.1	112.02	126.32	157.83	145.84	173.51					
U _{urea} V (mg/min)	50.23	49.41	60.68	69.57	100.04	78.08	86.01					
Urea reabsorption (mg/min)	75.77	55.69	51.34	56.75	57.79	67.76	87.5					
C _{urea} (ml/min)	63.60	63.22	71.31	133.79	192.02	152.95	165.24					
FE _{urea} (%)	39.86	45.75	54.16	55.08	63.39	53.54	49.57					
U _N V (mg/min)	60.12	73.05	54.03	52.25	62.70	53.35	55.68					
U _{non-urea N} V (mg/min)	36.68	50.06	25.71	19.77	15.98	16.97	15.52					
Plasma urea (mg%)	58.07	58.82	59.57	52.0	52.1	51.1	52.1					
PCV (%)	27.0	28.0	28.0	23.5	25.0	25.0	25.0					
U _{Na} V (mEq/min)	0.098	0.113	0.118	0.803	1.027	0.361	0.342					
U _K V (mEq/min)	1.259	1.279	1.490	0.807	1.340	1.378	1.337					
U _{Cl} V (mEq/min)	0.846	0.853	0.949	1.624	2.543	1.725	1.887					
U _{Ca} V (mg/min)	0.054	0.052	0.050	1.179	1.788	1.097	1.142					
U _{Pi} V (mg/min)	0.016	0.012	0.012	0.036	0.065	0.031	0.033					
FE _{Na} (%)	0.346	0.469	0.486	2.591	2.646	1.042	0.833					
FE _K (%)	128.95	164.11	193.29	76.16	103.02	121.99	103.20					
FE _{Cl} (%)	3.862	4.799	5.311	6.506	7.838	5.870	5.758					
FE _{Ca} (%)	0.286	0.332	0.337	6.489	7.967	5.550	4.873					
FE _{Pi} (%)	0.187	0.167	0.187	0.309	0.620	0.248	0.229					
P _{Osm} (mOsm/kg)	235	252	261	274	268	259	250					
C _{Osm} (ml/min)	15.493	14.219	15.697	17.541	25.050	21.286	20.948					
C _{H₂O} (ml/min)	-10.573	-9.394	-10.337	-10.956	-15.375	-15.566	-15.008					

Changes of renal function, electrolyte and urea excretion, fractional electrolyte excretion and free water clearance of buffalo No. 2 during control and heat exposure period.

	control period						heat exposure period					
	hour						hour					
	1	2	3	0	1	2	3	0	1	2	3	
GFR (ml/min)	257.88	269.80	305.17	276.57	286.05	279.15	305.01	276.57	286.05	279.15	305.01	
ERPF (ml/min)	1159.11	1209.0	1448.09	832.92	877.94	977.71	1070.80	832.92	877.94	977.71	1070.80	
RBF (ml/min)	1644.13	2296.09	2068.7	1189.89	1210.95	1330.22	1456.87	1189.89	1210.95	1330.22	1456.87	
FF (%)	22.248	22.316	21.074	33.204	32.582	28.551	28.484	33.204	32.582	28.551	28.484	
V (ml/min)	5.23	8.25	7.40	6.82	12.44	10.79	6.73	6.82	12.44	10.79	6.73	
Filtered load of urea (mg/min)	128.94	161.8	154.45	151.28	158.19	151.3	162.88	151.28	158.19	151.3	162.88	
U _N (mg/min)	70.34	103.46	87.62	79.9	80.32	76.93	86.78	79.9	80.32	76.93	86.78	
Urea reabsorption (mg/min)	58.60	58.34	66.83	71.38	77.87	74.37	76.1	71.38	77.87	74.37	76.1	
C urea (ml/min)	143.65	206.91	175.24	146.07	145.24	141.94	162.51	146.07	145.24	141.94	162.51	
FE urea (%)	55.71	63.94	56.73	52.81	50.77	50.85	53.28	52.81	50.77	50.85	53.28	
U _N (mg/min)	60.58	74.81	101.08	48.93	68.49	69.89	70.09	48.93	68.49	69.89	70.09	
U _{non-urea N} (mg/min)	17.33	38.77	60.19	11.68	31.56	34.06	29.42	11.68	31.56	34.06	29.42	
Plasma urea (mg%)	50.0	50.0	50.0	54.7	55.3	54.2	53.4	54.7	55.3	54.2	53.4	
PCV (%)	29.5	30.0	30.0	30.0	27.5	26.5	26.5	30.0	27.5	26.5	26.5	
U _{Na} V (mEq/min)	0.012	0.038	0.044	0.051	0.065	0.080	0.077	0.051	0.065	0.080	0.077	
U _K V (mEq/min)	1.537	1.633	1.835	0.998	1.263	1.399	1.202	0.998	1.263	1.399	1.202	
U _{Cl} V (mEq/min)	1.022	1.192	1.702	0.983	1.320	1.435	1.241	0.983	1.320	1.435	1.241	
U _{Ca} V (mg/min)	0.792	0.931	1.294	1.279	1.540	1.977	1.251	1.279	1.540	1.977	1.251	
U _{PI} V (mg/min)	0.025	0.026	0.024	0.027	0.027	0.023	0.043	0.027	0.027	0.023	0.043	
FE _{Na} (%)	0.029	0.118	0.114	0.142	0.183	0.236	0.212	0.142	0.183	0.236	0.212	
FE _K (%)	114.58	160.57	150.34	81.89	104.81	125.20	93.99	81.89	104.81	125.20	93.99	
FE _{Cl} (%)	3.229	4.394	5.633	3.824	4.665	5.174	4.229	3.824	4.665	5.174	4.229	
FE _{Ca} (%)	2.973	4.240	4.803	5.598	8.871	8.938	4.877	5.598	8.871	8.938	4.877	
FE _{PI} (%)	0.199	0.286	0.230	0.022	0.218	0.204	0.340	0.022	0.218	0.204	0.340	
Posm (mOsm/kg)	266	267	256	267	261	253	255	266	261	253	255	
Cosm (ml/min)	18.640	15.247	21.341	14.926	18.402	20.184	19.493	14.926	18.402	20.184	19.493	
C _{H₂O} (ml/min)	-12.63	-8.502	-13.941	-8.111	-5.962	-9.399	-12.764	-8.111	-5.962	-9.399	-12.764	

Changes of renal function, electrolyte and urea excretion, fractional electrolyte excretion and free water clearance of buffalo No. 3 during control and heat exposure period.

	control period				heat exposure period			
	hour				hour			
	1	2	3	0	1	2	3	
GFR (ml/min)	229.87	257.96	262.33	327.55	313.22	289.01	262.57	
ERPF (ml/min)	1046.35	1142.77	1120.53	1420.68	1311.63	1390.84	1206.67	
RBF (ml/min)	1423.61	1587.18	1524.53	1946.14	1784.53	1892.30	1646.21	
FF (%)	21.969	22.573	23.411	23.056	23.880	20.780	21.760	
V (ml/min)	2.69	3.08	3.10	6.18	5.02	3.72	3.29	
Filtered load of urea (mg/min)	58.85	66.04	67.16	147.4	137.82	132.08	119.99	
U _{urea} V (mg/min)	42.23	49.28	47.77	105.06	97.44	91.10	88.83	
Urea reabsorption (mg/min)	16.62	16.76	19.39	42.34	40.38	40.98	31.16	
C urea (ml/min)	164.96	192.5	186.64	233.47	221.45	199.34	194.38	
FE urea (%)	71.76	74.62	71.13	71.28	70.70	68.97	74.03	
U _N V (mg/min)	30.94	39.86	45.38	51.29	46.74	45.01	49.07	
U _{non-urea N} V (mg/min)	11.23	16.87	23.08	2.26	1.27	2.50	7.37	
Plasma urea (mg%)	25.6	25.6	25.6	45.0	44.0	45.7	45.7	
PCV (%)	26.5	28.0	26.5	27.0	26.5	26.5	26.7	
U _{Na} V (mEq/min)	0.059	0.080	0.090	0.111	0.100	0.082	0.062	
U _K V (mEq/min)	0.764	0.893	0.829	1.199	1.185	0.804	0.672	
U _{Cl} V (mEq/min)	0.218	0.339	0.350	0.902	0.843	0.398	0.348	
U _{Ca} V (mg/min)	0.056	0.083	0.063	1.085	0.871	0.314	0.329	
U _{P_i} V (mg/min)	0.036	0.039	0.041	0.069	0.043	0.042	0.037	
FE _{Na} (%)	0.194	0.233	0.265	0.274	0.259	0.221	0.186	
FE _K (%)	89.83	93.59	62.37	83.19	108.08	77.23	73.50	
FE _{Cl} (%)	0.939	1.288	1.466	2.962	2.720	1.350	1.321	
FE _{Ca} (%)	0.304	0.402	0.322	4.231	3.616	1.366	1.565	
FE _{P_i} (%)	0.363	0.360	0.356	0.488	0.465	0.383	0.373	
P _{Onm} (mOsm/kg)	270	278	270	273	262	267	271	
C _{Onm} (ml/min)	8.757	10.335	9.631	14.511	15.558	11.494	10.052	
C _{H₂O} (ml/min)	-6.067	-7.255	-6.531	-8.331	-10.538	-7.774	-6.767	

Changes of renal function, electrolyte and urea excretion, fractional electrolyte excretion and free water clearance of buffalo No. 4 during control and heat exposure period.

	control period			heat exposure period			
	hour			hour			
	1	2	3	0	1	2	3
GFR (ml/min)	411.01	361.18	327.02	388.1	421.18	405.18	336.49
ERPF (ml/min)	1881.33	1717.12	1729.24	1265.06	1440.02	1531.96	1244.72
RBF (ml/min)	2542.34	2304.86	2321.13	1860.38	2117.68	2269.57	1817.11
FF (%)	21.847	21.034	18.911	30.678	29.248	26.448	27.033
V (ml/min)	24.80	20.85	17.80	11.52	12.59	11.41	8.99
Filtered load of urea (mg/min)	187.83	163.25	152.06	201.42	221.54	207.65	174.13
U _{urea} -V (mg/min)	165.61	133.54	129.33	131.73	154.56	141.48	115.07
Urea reabsorption (mg/min)	22.22	29.71	22.73	69.69	66.98	66.17	59.06
C urea (ml/min)	362.39	295.44	278.13	253.82	293.84	276.06	222.36
FE urea (%)	88.17	81.80	85.05	65.40	69.77	68.13	66.08
U _N -V (mg/min)	345.68	271.21	320.04	72.79	87.29	90.24	75.60
U _{non-urea N} -V (mg/min)	268.25	208.89	259.68	11.48	15.20	24.46	22.13
Plasma urea (mg%)	45.7	45.2	46.5	51.9	52.6	51.3	51.8
PCV (%)	26.0	25.5	25.5	32.0	32.0	32.5	31.5
U _{Na} -V (mEq/min)	0.161	0.227	0.196	0.230	0.309	0.354	0.290
U _K -V (mEq/min)	3.802	3.428	3.115	2.276	2.465	2.136	1.828
U _{Cl} -V (mEq/min)	3.010	2.894	2.528	1.661	1.904	1.784	1.229
U _{Ca} -V (mg/min)	0.794	0.801	0.641	0.311	0.473	0.557	0.290
U _{Pi} -V (mg/min)	0.045	0.037	0.027	0.081	0.243	0.312	0.106
FE _{Na} (%)	0.300	0.488	0.471	0.468	0.590	0.693	0.680
FE _K (%)	190.60	216.76	399.35	133.50	137.14	121.10	122.30
FE _{Cl} (%)	7.946	7.883	7.362	4.330	4.525	4.317	3.786
FE _{Ca} (%)	2.860	3.167	2.319	1.006	1.527	1.847	1.139
FE _{Pi} (%)	0.233	0.228	0.160	0.384	0.901	1.209	0.559
P _{Osm} (mOsm/kg)	268	266	268	284	268	275	267
C _{Osm} (ml/min)	29.928	37.304	34.803	26.274	30.228	30.019	24.271
C _{H₂O} (ml/min)	-15.128	-16.454	-17.003	-14.754	-17.638	-18.614	-15.276

Changes of renal function, electrolyte and urea excretion, fractional electrolyte excretion and free water clearance of buffalo No. 5 during control and heat exposure period.

	control period			heat exposure period			
	hour			hour			
	1	2	3	0	1	2	3
GFR (ml/min)	285.45	353.69	301.41	276.04	283.69	290.84	307.07
ERPF (ml/min)	845.14	1315.70	1136.90	1646.45	1378.95	1496.87	1457.36
RBF (ml/min)	1104.76	1754.27	1515.87	2302.73	1915.21	2036.56	1969.41
FF (%)	33.775	26.882	26.512	16.766	20.573	19.430	21.070
V (ml/min)	9.30	12.87	10.00	4.27	4.11	4.25	4.40
Filtered load of urea (mg/min)	142.73	185.69	155.23	92.2	94.47	93.94	100.26
U _{urea} V (mg/min)	98.63	141.44	111.3	68.68	67.32	71.37	67.76
Urea reabsorption (mg/min)	44.10	44.25	43.93	23.52	27.15	22.57	32.5
C urea (ml/min)	197.26	269.41	216.12	205.63	202.16	220.96	207.53
FE urea (%)	69.10	76.17	71.70	74.49	71.26	75.97	67.58
U _N V (mg/min)	143.46	149.55	157.38	52.19	40.38	53.64	44.35
U _{non-urea} V (mg/min)	97.94	82.77	105.20	19.78	8.96	20.74	12.66
Plasma urea (mg%)	50.0	52.5	51.5	33.4	33.3	32.3	32.7
PCV (%)	23.5	25.0	25.0	28.5	28.0	26.5	26.0
U _{Na} V (mEq/min)	0.437	0.551	0.569	0.406	0.212	0.196	0.315
U _K V (mEq/min)	2.216	2.180	2.220	0.627	0.726	0.903	0.825
U _{Cl} V (mEq/min)	1.584	1.345	1.239	0.870	0.810	0.638	0.553
U _{Ca} V (mg/min)	0.241	0.165	0.178	0.789	0.781	0.414	0.639
U _{Pi} V (mg/min)	0.034	0.039	0.068	0.017	0.015	0.018	0.023
FE _{Na} (%)	1.201	1.233	1.435	1.140	0.582	0.547	0.781
FE _K (%)	168.02	139.55	162.88	62.94	64.50	87.66	74.17
FE _{Cl} (%)	5.658	3.933	1.265	3.028	2.872	2.356	1.798
FE _{Ca} (%)	1.024	0.572	0.693	2.981	3.136	1.697	2.278
FE _{Pi} (%)	0.182	0.199	0.344	0.122	0.127	0.152	0.198
F _{Osm} (mOsm/kg)	259	268	267	274	278	276	273
C _{Osm} (ml/min)	26.611	28.661	27.711	12.098	10.864	12.152	12.143
C _{H₂O} (ml/min)	-17.311	-13.361	-17.755	-7.828	-6.754	-7.902	-7.743

Changes of some plasma constituents and plasma electrolyte concentrations of buffaloes No. 1 and 2 during control and heat exposure period.

	buffalo No.1										buffalo No.2									
	min					min					min					min				
	0	30	60	90	120	150	0	30	60	90	120	150	0	30	60	90	120	150		
Glucose (mg%)	C	52.8	53.1	52.9	55.0	54.8	55.6	C	42.1	47.4	31.1	37.3	37.8	42.9						
	H	62.3	73.0	68.9	77.2	68.3	75.8	H	62.5	65.8	68.6	66.9	65.0	72.7						
Protein (gm%)	C	9.36	9.39	10.04	9.11	9.75	9.64	C	10.45	10.24	9.66	10.24	10.21	9.73						
	H	8.89	8.64	9.56	9.07	9.47	9.36	H	8.96	9.77	9.17	9.83	9.34	10.09						
Globulin (gm%)	C	4.83	4.75	4.89	4.56	4.34	4.55	C	5.31	5.25	5.24	5.45	5.30	5.37						
	H	4.43	4.99	5.10	5.05	4.98	4.67	H	5.22	5.09	5.34	5.24	5.24	5.28						
Albumin (gm%)	C	4.53	4.64	5.15	4.55	5.41	5.09	C	5.14	4.99	4.42	4.79	4.91	4.36						
	H	4.46	3.65	4.46	4.02	4.49	4.69	H	3.74	4.68	3.83	4.59	4.10	4.81						
A/G ratio	C	0.938	0.977	1.053	0.997	1.246	1.119	C	0.968	0.950	0.844	0.879	0.926	0.812						
	H	1.007	0.731	0.875	0.796	0.902	1.004	H	0.716	0.919	0.717	0.876	0.782	0.911						
Creatinine (mg%)	C	1.66	1.69	1.77	1.69	1.69	1.74	C	1.52	1.33	1.45	1.46	1.27	1.38						
	H	1.95	1.98	2.06	2.03	1.79	1.98	H	1.40	1.40	1.39	1.32	1.46	1.56						
Triacylglycerol (mg%)	C	16.33	—	—	—	—	14.14	C	28.91	—	—	—	—	22.71						
	H	10.67	—	—	—	—	6.29	H	21.25	—	—	—	—	18.97						
Plasma Na ⁺ (mEq/l)	C	115	133	131	135	134	135	C	112	127	126	121	118	117						
	H	142	135	141	138	142	136	H	132	130	134	132	133	130						
Plasma K ⁺ (mEq/l)	C	3.8	4.8	8.0	4.1	4.6	4.2	C	4.3	4.6	4.4	3.9	3.9	3.9						
	H	4.8	4.5	4.5	4.2	4.3	4.1	H	4.3	4.5	4.3	4.4	4.4	4.6						
Plasma Cl ⁻ (mEq/l)	C	89	80	85	95	88	92	C	86	93	98	96	93	104						
	H	102	111	103	94	94	99	H	100	96	102	99	102	101						
Plasma Ca ^{Z+} (mg%)	C	8.53	8.15	7.64	7.44	8.01	7.64	C	8.96	7.84	8.78	8.04	7.70	8.98						
	H	8.65	8.18	8.32	7.90	8.69	7.75	H	9.07	8.81	9.02	9.13	8.72	8.67						
Plasma P _i (mg%)	C	3.08	3.46	3.88	3.71	3.53	2.81	C	5.62	3.62	3.77	3.31	3.0	3.08						
	H	5.31	4.27	4.31	4.31	4.19	3.96	H	3.88	4.46	3.73	3.85	3.88	3.77						

C = control period, H = heat exposure period

Changes of some plasma constituents and plasma electrolyte concentrations of buffaloes No. 3 and 4 during control and heat exposure period.

	buffalo No.3						buffalo No.4							
	min						min							
	0	30	60	90	120	150	0	30	60	90	120	150		
Glucose (mg%)	C	57.0	53.5	59.8	58.0	57.0	62.6	C	52.9	55.1	62.2	67.8	66.2	69.1
	H	52.0	53.9	61.1	60.3	70.4	81.4	H	71.6	71.4	70.3	69.8	76.0	90.3
Protein (gm%)	C	11.15	11.62	10.62	11.17	11.19	11.04	C	8.90	8.83	8.79	8.71	8.69	8.49
	H	9.48	9.22	9.70	9.98	9.92	9.76	H	9.07	8.69	9.11	9.41	9.30	9.30
Globulin (gm%)	C	6.51	6.10	6.36	6.27	6.05	6.43	C	4.79	4.76	5.22	4.71	4.92	4.71
	H	5.47	5.74	5.44	5.44	5.80	5.99	H	5.56	5.50	5.54	5.33	4.77	5.26
Albumin (gm%)	C	4.64	5.52	4.26	4.90	5.14	4.61	C	4.11	4.07	3.57	4.0	3.77	3.78
	H	4.01	3.48	4.26	4.54	4.12	3.77	H	3.51	3.19	3.57	4.08	4.53	4.04
A/G ratio	C	0.713	0.905	0.670	0.781	0.850	0.717	C	0.858	0.855	0.684	0.849	0.766	0.803
	H	0.733	0.606	0.783	0.835	0.710	0.629	H	0.631	0.580	0.644	0.765	0.950	0.768
Creatinine (mg%)	C	1.62	1.62	1.58	1.55	1.52	1.51	C	1.12	1.12	1.05	1.17	1.15	1.19
	H	1.69	1.76	1.78	1.85	1.93	1.96	H	1.27	1.38	1.27	1.33	1.38	1.42
Triacylglycerol (mg%)	C	22.62	—	—	—	—	17.51	C	16.05	—	—	—	—	14.59
	H	19.97	—	—	—	—	10.95	H	8.57	—	—	—	—	10.85
Plasma Na ⁺ (mEq/l)	C	140	—	138	135	141	142	C	134	129	137	134	134	134
	H	137	133	133	133	133	133	H	139	134	138	138	135	139
Plasma K ⁺ (mEq/l)	C	2.7	—	4.7	4.4	3.8	3.8	C	4.9	4.5	5.2	4.6	4.8	4.1
	H	4.9	3.6	4.7	3.5	4.1	3.7	H	4.9	4.6	4.7	4.9	4.8	4.7
Plasma Cl ⁻ (mEq/l)	C	102	102	102	103	103	98	C	93	88	99	101	102	107
	H	90	92	98	98	93	89	H	101	98	104	103	101	107
Plasma Ca ²⁺ (mg%)	C	8.36	7.81	9.16	8.25	8.13	7.82	C	7.13	7.10	6.78	6.96	7.39	7.16
	H	8.92	8.75	8.61	8.55	8.12	8.49	H	7.93	7.68	7.82	8.07	8.07	8.01
Plasma P _i (mg%)	C	4.15	4.04	3.92	3.77	3.27	3.33	C	4.69	4.69	5.08	4.69	5.04	5.12
	H	4.27	3.69	4.27	4.35	4.23	3.77	H	5.77	5.77	6.15	6.23	5.46	5.23

C = control period, H = heat exposure period

Changes of some blood constituents and plasma electrolyte concentrations of buffalo No. 5 during control and heat exposure period.

		0	30	60	90	120	150 min
Glucose (mg%)	C	40.7	49.8	42.1	57.9	60.9	51.5
	H	50.8	52.5	67.5	60.0	67.1	82.7
Protein (gm%)	C	9.05	9.26	9.37	9.37	9.49	9.49
	H	9.20	9.37	9.96	9.64	9.70	9.41
Globulin (gm%)	C	5.57	5.18	5.35	5.1	5.75	5.31
	H	4.93	5.07	4.92	5.24	4.89	5.04
Albumin (gm%)	C	3.48	4.08	4.02	4.27	3.74	4.18
	H	4.27	4.30	5.04	4.40	4.81	4.37
A/G ratio	C	0.625	0.788	0.751	0.837	0.650	0.787
	H	0.866	0.848	1.024	0.840	0.984	0.867
Creatinine (mg%)	C	1.19	1.14	1.15	1.16	1.12	1.23
	H	1.38	1.38	1.30	1.22	1.29	1.49
Triacylglycerol (mg%)	C	8.57	—	—	—	—	13.68
	H	13.50	—	—	—	—	11.04
Plasma Na ⁺ (mEq/l)	C	136	138	139	—	136	139
	H	141	137	139	140	142	139
Plasma K ⁺ (mEq/l)	C	5.2	5.2	5.0	—	4.7	4.8
	H	4.2	3.9	4.1	3.8	4.0	4.0
Plasma Cl ⁻ (mEq/l)	C	99	90	97	93	97	99
	H	105	98	103	103	98	100
Plasma Ca ²⁺ (mg%)	C	7.67	8.22	7.85	7.88	7.65	7.96
	H	8.59	8.82	8.96	8.76	8.67	8.39
Plasma P _i (mg%)	C	6.65	6.37	6.08	5.31	5.0	6.12
	H	4.15	3.85	3.92	3.38	3.96	3.38

C = control period, H = heat exposure period

BIOGRAPHY

Miss Chollada Buranakarl was born on October, 5, 1960, in Bangkok and graduated D.V.M. from Faculty of Veterinary Science, Chulalongkorn University in 1984. At present she is one of the staff in Department of Physiology, Faculty of Veterinary Science, Chulalongkorn University.



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